Exhibit G

105921
AIR 043 00092

Nebraska DEQ

Fact Sheet for Permit Number: CP15-008
Date: April 15, 2016

Facility Name: Big Ox Energy – Siouxland, LLC **NDEQ Facility ID#:** 105921

Mailing Address:
6601 County Road R
Denmark, Wisconsin 54208

Facility Location:
1616 D Avenue
Dakota City, Dakota County, Nebraska

DESCRIPTION OF THE FACILITY:

Big Ox Energy – Siouxland, LLC (Big Ox) is a new biologically-based natural gas production facility located in Dakota City, Nebraska. On May 18, 2015, the NDEQ received a finalized air quality construction permit application from Big Ox (#15-008) for a biogas facility capable of producing up to 1,314 million standard cubic feet (MMscf) of biogas per year from an anaerobic digestion process. Big Ox will process wastewater and organic wastes from the surrounding industries. Big Ox operates under Standard Industrial Classification (SIC) Code 2869 – Industrial Organic Chemicals, Not Elsewhere Classified and North American Industry Classification System (NAICS) Code 325199 – All Other Basic Organic Chemical Manufacturing.

On June 3, 2015, the NDEQ received an application for a variance to construct the proposed biologically-based natural gas production facility, which the NDEQ issued on July 14, 2015.

TYPE AND QUANTITY OF AIR CONTAMINANT EMISSIONS ANTICIPATED:

The emission units that comprise the production facility are discussed in further detail below. The fact sheet attachment shows the potential emissions calculations with full references.

Biogas System
Big Ox will receive liquid wastewater through three forcemains into the facility that will collect in the Dissolved Air Flotation (DAF) Feed Tank. The DAF Feed Tank contents will be transferred to undergo treatment in a DAF process unit; the resulting solids from the DAF will be sent to the Equalization/Mixing Tank while the effluent wastewater will be sent to the sanitary sewer.

Big Ox will receive high strength wastes and packaged/canned food wastes by truck. The high strength wastes will be unloaded into two receiving pits which flow to the Receiving Tank, while the packaged/canned food wastes will be unloaded into a Turbo Separator. The Turbo Separator will separate the organic waste from the packaging material and the organic waste will be sent to the Receiving Tank while the packaging waste will be hauled out by truck. The Receiving Tank contents will be pumped to the Equalization/Mixing Tank.

From the Equalization/Mixing Tank, Big Ox will transfer the contents through a heat exchanger to Anaerobic Digester #1 (EU12) and then to Anaerobic Digester #2 (EU13). The contents from EU13 will be dewatered using two centrifuges; the centrate from the centrifuges will be sent to the DAF Feed Tank while the dewatered cake will be hauled out by truck. Big Ox will send the untreated biogas from EU12 and EU13 to the Biogas Cleanup Skid System (EU07). EU07 will scrub, compress, and directly inject the treated biogas into the adjacent natural gas transmission line. The scrubbing process will result in crystalline sulfur solids that will be washed and sold as a sulfur by-product. The compression process will result in a compressor tail gas that will be vented directly to the atmosphere.

If EU07 is unavailable or treated biogas cannot be injected into the natural gas transmission line, Big Ox will send the untreated biogas from EU12 and EU13 to an industrial flare (EU06) rated at 102.0 Million British thermal units per hour (MMBtu/hr). Big Ox has requested an operational limitation of 500 annual operating hours for EU06 to limit emissions from the combustion of untreated biogas.

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EU06 will be capable of emitting particulate matter (PM), PM with an aerodynamic diameter of less than or equal to 10 microns (PM_{10}), PM with an aerodynamic diameter of less than or equal to 2.5 microns ($PM_{2.5}$), sulfur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), hazardous air pollutants (HAPs), and hydrogen sulfide (H_2S). EU07 will be capable of emitting H_2S.

Emergency Engine
Big Ox will have one 4-stroke lean burn (4SLB), 155 brake horsepower (hp) natural gas-fired spark ignition (SI) reciprocating internal combustion engine (RICE) to provide power to the facility in emergency situations (EU08). Because EU08 will operate as an emergency generator engine, Big Ox has requested an operational limitation of 500 annual operating hours. This unit will be capable of emitting PM, PM_{10}, $PM_{2.5}$, SO_x, NO_x, CO, VOCs, and HAPs.

Combustion Equipment
Big Ox will have five natural gas-fired boilers rated at 0.80 MMBtu/hr each (EU01 through EU05) used for generating process steam. In addition, the facility will have three natural gas-fired make-up air units to maintain adequate conditions within the processing area, two rated at 2.25 MMBtu/hr each (EU09 and EU10) and one rated at 1.505 MMBtu/hr (EU11). These units will be capable of emitting PM, PM_{10}, $PM_{2.5}$, SO_x, NO_x, CO, VOCs, and HAPs.

Paved Haul Roads
Big Ox provided estimated haul road distances of paved haul road travel within the facility for each type of haul road activity. The haul roads are a source of fugitive PM, PM_{10}, and $PM_{2.5}$ emissions.

Emissions Summary
The following table lists the potential emissions, including fugitive emissions, after permit issuance.

Regulated Pollutant	Emissions (tons/year)
Particulate Matter (PM)	2.27
PM smaller than or equal to 10 microns (PM_{10})	1.12
PM smaller than or equal to 2.5 microns ($PM_{2.5}$)	0.85
Sulfur Dioxide (SO_2)	1.86
Oxides of Nitrogen (NO_x)	6.80
Carbon Monoxide (CO)	22.88
Volatile Organic Compounds (VOC)	0.49
Hazardous Air Pollutants (HAPs)	0.11
Hydrogen Sulfide (H_2S)	4.17
Greenhouse Gases (GHG):	
Mass Basis	24,609
CO_2e Basis	35,983

APPLICABLE REQUIREMENTS AND VARIANCES OR ALTERNATIVES TO REQUIRED STANDARDS:

Chapter 4 – Ambient Air Quality Standards:
Potential emissions from Big Ox, as limited by this permit, of all regulated air pollutants except for Total Reduced Sulfur (TRS) are less than the thresholds for which air dispersion modeling may be required as found in the NDEQ modeling guidance document entitled *Atmospheric Dispersion Modeling Guidance for Permits* (September 2005). Therefore, air dispersion modeling of TRS emissions was required as part of this permitting action. As described below, the modeling analysis predicts that Big Ox will remain in compliance with the ambient air quality standards for TRS.

Air Quality Impact Analysis
The air quality impact analysis for the proposed Big Ox facility consists of a screening model analysis to demonstrate that the proposed facility will not cause or contribute to any violations of Nebraska TRS Ambient Air Quality Standards (AAQS) listed in the table below. The screening analysis was completed for

only the 30-minute TRS AAQS. There are no models available that can predict impacts for 1-minute averaging periods.

Nebraska AAQS Total Reduced Sulfur (TRS)		
Averaging Time	**Concentration (ppm)**	**Form**
1 minute	10.0	Maximum average concentration
30-minutes	0.10	Maximum rolling average

The specifics of the air quality impact analysis can be found in the facility's permitting file at the NDEQ. The modeling analysis used a screening model and was completed by HDR Engineering, Inc. and reviewed by the NDEQ. The U.S. EPA AERSCREEN version 14147, utilizing AERMOD version 14134, was the screening model used in this effort. The 30-minute maximum ambient air concentration is derived from the maximum 1-hour predicted concentration using the 1/5th Power Law. For the purpose of this modeling effort the Department looked at the maximum 30-minute modeled impact as demonstration of compliance with the maximum rolling average Nebraska TRS AAQS.

TRS Results

The TRS results for Nebraska TRS AAQS compliance are shown in the table below. The Digester Biogas Flare (EU06) and the Biogas Cleanup Skid System Tail Gas (EU07) were modeled separately, and their maximum impacts were added together.

Emission unit	**AERSCREEN Maximum Modeled Prediction (ppm)**	**30-minute Nebraska AAQS (ppm)**
EU06: Digester Biogas Flare	.0007	0.1
EU07: Biogas Cleanup Skid System Tail Gas	.09	
Total	0.0907	

Air Quality Impact Summary

The screening analysis demonstrates that impacts from the Digester Biogas Flare and the Biogas Cleanup Skid System Tail Gas emission units added together do not indicate a modeled violation of the Nebraska AAQS for TRS, and no further refined modeling is required.

The original AERSCREEN modeling analysis as performed by the consultant contained the two emission units capable of emitting H_2S. The analysis included the conservative assumption that both of the units would be operating simultaneously; however, the units cannot operate at the same time, as there would not be sufficient biogas production at the facility. In addition, the NDEQ calculated a facility-wide H_2S emission rate less than the emission rate calculated by the consultant. For these reasons, the NDEQ is confident that the H_2S emissions from the proposed Big Ox facility will comply with the Nebraska TRS AAQS, without conducting additional modeling at the lower emission rate.

To ensure that assumptions used in the modeling remain valid, the facility will have to meet stack height requirements for the various point sources and restrict public access to the facility (e.g., installing a fence in accordance with NDEQ guidelines or implementing other equivalent public access restrictions). If the results of any testing are significantly higher than the corresponding values used in the modeling, then the facility may need to remodel to show compliance with the Nebraska TRS AAQS.

Chapters 5 and 7 – Operating Permit Requirements:

After permit issuance, the potential emissions from Big Ox will not exceed one half of any of the Class I thresholds identified in Chapter 2, and Big Ox will therefore be considered a "no operating permit required-synthetic minor" (NPR-SM) source under the operating permit program. In accordance with Chapter 5, a NPR-SM facility has potential emissions above the Class I thresholds before permit issuance and actual

emissions below 50% of the Class I thresholds after permit issuance. Fugitive emissions were included when determining Class I applicability because Big Ox is a chemical process plant, which is one of the listed categories in Chapter 2, Section 002.

Chapter 17 – Construction Permit Requirements:
Big Ox is required to obtain a state construction permit because the potential emissions of NO_x and CO prior to construction permit issuance exceed the thresholds identified in Chapter 17, Section 001.01.

The source-wide potential emissions including fugitives from Big Ox, after the issuance of this permit, fall into the following construction permit fee category:

Less than 50 tons per year of any listed air pollutant; or
Less than 2.5 tons per year of any single HAP; or
Less than 10 tons per year of any combination of HAPs

Therefore, Big Ox submitted a $250.00 fee to obtain this Air Quality Construction Permit, in accordance with Chapter 17, Section 003.01.

Chapter 18 – New Source Performance Standards (NSPS), and 40 CFR Part 60:
The emergency generator engine EU08 is subject to NSPS Subpart JJJJ. Because EU08 is subject to this NSPS, it is also subject to NSPS Subpart A. These subparts as well as potentially applicable subparts reviewed by the NDEQ are summarized below.

The NDEQ has identified the following NSPS as applicable to Big Ox:

Subpart A – General Provisions: This subpart, adopted by reference in Title 129, Chapter 18, Section 001.01, applies to those units subject to another NSPS subpart. EU08 is subject to Subpart JJJJ, and is therefore subject to the requirements of this subpart. Subpart JJJJ lists the sections of Subpart A that are applicable to EU08.

Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines: This subpart, adopted by reference in Title 129, Chapter 18, Section 001.82, applies to manufacturers, owners, and operators of SI internal combustion engines (ICE) as specified within this subpart. EU08 is subject to Subpart JJJJ because it is an SI ICE built after June 12, 2006. EU08 is required to comply with all requirements as specified within this subpart for emergency, 4SLB, stationary SI ICE greater than or equal to 130 hp. These requirements include emissions, operational, notification, reporting, and recordkeeping requirements for EU08. Big Ox will operate EU08 as an emergency stationary SI ICE under Subpart JJJJ. If Big Ox chooses not to operate EU08 as an emergency engine, the applicable requirements under this subpart may change.

The NDEQ has identified the following NSPS as not applicable to Big Ox:

Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines: This subpart, adopted by reference in Title 129, Chapter 18, Section 001.76, applies to manufacturers, owners, and operators of compression ignition (CI) ICE of specific sizes manufactured after specific dates as detailed within the subpart. EU08 is not subject to this subpart because it is not a CI ICE.

Subpart OOOO – Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution: This subpart, adopted by reference in Title 129, Chapter 18, Section 001.89, applies to owners and operators of onshore affected facilities that commence construction, modification, or reconstruction after August 23, 2011. This subpart does not apply to any emission units at Big Ox because the facility is not a natural gas production, transmission, or distribution site as defined in Subpart OOOO.

It is Big Ox's obligation to comply with all applicable NSPS subparts and requirements regardless of their inclusion in this permitting action or Title 129. These rules are subject to change. Additional and updated information on all NSPS is on the NDEQ NSPS Notebook, which can be located by visiting the NDEQ website at http://deq.ne.gov/, and first selecting the "Air" tab, then the "Air Grants, Planning and Outreach Program" dropdown menu tab, then the "New Source Performance Standards (NSPS) Program" dropdown

menu tab, and then select "New Source Performance Standards (NSPS) Program". Or alternately use the "Search NDEQ Web" search box on the upper right of the webpage and enter "New Source Performance Standards".

Chapter 19 – Prevention of Significant Deterioration (PSD):
Potential emissions from this proposed construction do not exceed the PSD thresholds. Big Ox falls into one of the 28 categories for which the 100 tons per year threshold applies as described in Chapter 2, Section 008, and must include fugitive emissions when determining PSD applicability. In addition, the NDEQ does not consider greenhouse gases as a regulated air pollutant in accordance with Chapter 1, Section 130. Because the PTE after permit issuance is less than the major source thresholds, Big Ox is a PSD minor source.

Chapter 20 – Particulate Matter Emissions:
Section 002 – Particulate Emissions from Combustion Sources: EU01 through EU06 and EU08 through EU11 are subject to the requirements of this section. As shown in the Fact Sheet Attachment, Big Ox will comply with this regulation by combusting only natural gas in EU01 through EU05 and EU08 through EU11, by combusting only untreated biogas and natural gas in EU06, and by properly operating and maintaining all emission units.

Section 004 – Opacity: No person may cause or allow emissions which are of an opacity equal to or greater than twenty percent (20%) as evaluated by an EPA-approved method, or recorded by a continuous opacity monitoring system. Big Ox will comply with this regulation by properly operating and maintaining equipment.

Chapter 27 – Hazardous Air Pollutants:
Big Ox is not subject to the requirements of this chapter because, as a new source, the facility-wide PTE of any single HAP is less than the 2.5 tons per year threshold and total HAPs are less than the 10 tons per year threshold listed in Section 002.

Chapter 28 – Hazardous Air Pollutant Emission Standards (NESHAPs):
Big Ox is an area source of HAPs because the PTE for any single HAP is below 10 tons per year and the PTE for total HAPs is below 25 tons per year. The NDEQ has identified that EU08 is subject to NESHAP Subparts A and ZZZZ. These subparts as well as potentially applicable subparts reviewed by the NDEQ are summarized below.

The NDEQ has identified the following NESHAP as applicable to Big Ox:

Subpart A – General Provisions: This subpart, adopted by reference in Title 129, Chapter 28, Section 001.01, applies to the owner or operator of any stationary source subject to a NESHAP unless otherwise stated in the rule. EU08 is subject to Subpart ZZZZ and is therefore subject to the requirements of this subpart. Subpart ZZZZ lists the sections of Subpart A that are applicable to EU08.

Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines: This subpart, adopted by reference in Title 129, Chapter 28, Section 001.88, applies to existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand. For the purpose of this subpart, EU08 is considered a new unit at an area source because construction has not yet commenced. New SI RICE to be located at area sources must comply with NSPS Subpart JJJJ to demonstrate compliance with NESHAP Subpart ZZZZ. If Big Ox chooses not to operate EU08 as an emergency engine, the applicable requirements under this subpart may change.

The NDEQ has identified the following NESHAP as not applicable to Big Ox:

Subpart HH – National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities: This subpart, adopted by reference in Title 129, Chapter 28, Section 001.30, applies to the owners and operators of affected sources located at oil and natural gas production facilities. Big Ox is an area source of HAPs and will not utilize triethylene glycol dehydration units; therefore, Big Ox is not subject to any requirements under this subpart.

Subpart VVV – National Emission Standards for Hazardous Air Pollutants: Publicly Owned Treatment Works: This subpart, adopted by reference in Title 129, Chapter 28, Section 001.50, applies to publicly owned treatment works (POTW) that are major sources of HAPs, or industrial POTW that are major or area sources of HAPs. Big Ox is not considered a POTW or industrial POTW as defined in this subpart; therefore, Big Ox is not subject to any requirements under this subpart.

Subpart JJJJJJ – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources: This subpart, adopted by reference in Title 129, Chapter 28, Section 001.71, applies to each new and existing industrial, commercial, and institutional boiler located at an area source of HAPs. The boilers at Big Ox are not subject to this subpart because they are gas-fired boilers as defined in this subpart; therefore, Big Ox is not subject to any requirements under this subpart.

It is Big Ox's obligation to comply with all applicable NESHAP subparts and requirements regardless of their inclusion in this permitting action or Title 129. These rules are subject to change. Additional and updated information on all NESHAP is on the NDEQ Air Toxics Notebook, which can be located by visiting the NDEQ website at http://deq.ne.gov/, and first selecting the "Air" tab, then the "Air Grants, Planning and Outreach Program" dropdown menu tab, then the "Air Toxics Program" dropdown menu tab, and then select "Air Toxics Program". Or alternately use the "Search NDEQ Web" search box on the upper right of the webpage and enter "Air Toxics".

Permit conditions specific to the proposed permit are discussed as follows:

II.(A) When a source undertakes a program of construction, reconstruction, or modification they are required to notify the NDEQ when they begin construction/reconstruction/modification and when the source or modification becomes operational. These notifications help the NDEQ and source determine when an operating permit application (or revision to an existing operating permit) may be necessary and also whether some emission increases or decreases are within the contemporaneous period. This notification is either for initial operation of the source as a whole (if constructing a new source) or initial operation of the completed project (if modifying an existing source), not individual emission units. Individual emission units subject to specific NSPS or NESHAP standards may have additional notification requirements specific to those federal standards that are independent of this requirement. Startup of individual emission units (such as a boiler subject to an NSPS) does not necessarily mean the source or project has begun operations.

II.(B) This condition contains general recordkeeping and reporting requirements that apply to all permitted emission units, control equipment, and monitoring devices. Requirements include: a completion date when records must be completed, how long records need to be maintained, and the identification of specific types of records that must be maintained. Records are required to be maintained to ensure compliance with all applicable requirements, specifically those required in this permit. However, additional recordkeeping requirements may be established in the future to better ensure compliance. Documentation detailing operation and maintenance can be operational and maintenance manuals provided by the manufacturer. If manufacturer manuals are not available, the owner or operator must develop a document containing proper operation and maintenance requirements for each permitted emission unit and piece of required control equipment.

II.(C) This condition requires all permitted emission units, control equipment, and monitoring equipment to be properly installed, operated, and maintained. It is expected that the installation, operation, and maintenance conducted will be similar to the items contained in the documents detailing proper operation, inspection, and maintenance of the equipment (required in Specific Condition II.(B)(5)). It is very important that permitted and required equipment is operating properly and maintained since poorly maintained equipment may emit greater amounts of pollution into the atmosphere or monitor information incorrectly or inaccurately. Emission estimates for this permitting action are based on the requirement that all equipment is operating properly and being properly maintained.

II.(D) General performance testing requirements. When performance testing is required, it is intended to demonstrate and ensure the source will be in compliance on a continuous basis. As such, testing is

generally required to be conducted under conditions producing the highest emissions or loading to a control device. This typically is done at the maximum capacity, which at that level would not create an unsafe condition, and the facility will operate at that level at least some of the time. For a comprehensive evaluation on representative testing conditions, please review the NDEQ guidance on stack testing available on our web site or the national stack testing guidance document found on EPA's web site. All performance tests required throughout this permit are required to be conducted in accordance with these conditions. The owner or operator must provide a testing protocol and written (i.e. hard copy, not electronic or verbal) notice prior to testing to ensure the NDEQ has the opportunity to witness the testing and review the proposed testing plan. Operating parameters are monitored and recorded to document the conditions under which the testing was conducted. Subsequent monitoring of these parameters can indicate whether additional testing may be necessary because previous testing is not representative of current operations.

II.(E) This condition requires any emissions resulting from equipment failures, malfunctions, or other variations in control or process equipment performance that are, or may be, in excess of the applicable emission control regulations to be reported to the NDEQ in accordance with Title 129, Chapter 35, Section 005. The NDEQ must be notified when excess emissions have, or may have occurred along with the cause of the emissions in order to determine the appropriate enforcement action. These reports also assist with verifying proper operation and maintenance of process and control equipment.

II.(F) Modeling was conducted based on the information about stack parameters and ambient air boundaries as identified in the application. Should this information change from the values specified in this condition, the source should make notification to the NDEQ in accordance with General Condition I.(D).

III.(A) Specific Conditions for Anaerobic Digestion

This condition specifies the requirements for the biogas system – EU06, EU07, EU12, and EU13. EP06 is subject to the sections listed for Title 129, Chapter 20. At all times that the anaerobic digesters are producing biogas, the biogas must be either combusted in EU06 or treated in EU07. This will prevent untreated biogas from being vented directly to the atmosphere.

The digester biogas flare can only combust untreated biogas in the flare and natural gas in the pilot. Big Ox requested an operational limitation on the annual operating hours of the digester biogas flare in order to limit the combustion of untreated biogas. In addition, a lit pilot or flame must be present at all times that biogas is being routed to EU06 to ensure that untreated biogas is being combusted.

Big Ox must perform daily observations during the hours of operation of EU07 to ensure that there are no visible emissions, leaks, noise from the unit, or atypical monitoring parameters. By requiring daily observations, the NDEQ is confident that any malfunctions will be detected and corrected quickly.

III.(B) Specific Conditions for Emergency Generator Engine

This condition specifies the requirements for the emergency engine, EU08. The permitted emission point is subject to the sections listed for Title 129, Chapter 20. Big Ox requested an operational limitation on the annual operating hours of the emergency generator engine because the emission unit will only be used as an emergency engine. EU08 is subject to NSPS Subparts A and JJJJ and NESHAP Subparts A and ZZZZ and must comply with all applicable requirements.

III.(C) Specific Conditions for Paved Haul Roads

This condition specifies the requirements for the paved haul roads. The maximum silt loading used to evaluate haul road emissions is representative of a well-maintained paved road at sources that conduct best management practices (BMPs). Big Ox must use BMP to prevent fugitive dust from escaping the property and comply with Chapter 32. If necessary, the facility must implement

necessary corrective actions, which for paved roads might include road washing, vacuum sweeping, wheel washes, and debris removal.

STATUTORY OR REGULATORY PROVISIONS ON WHICH PERMIT REQUIREMENTS ARE BASED:

Applicable regulations: Title 129 - Nebraska Air Quality Regulations as amended July 6, 2015.

PROCEDURES FOR FINAL DETERMINATION WITH RESPECT TO THE PROPOSED CONSTRUCTION PERMIT:

The public notice, as required under Title 129 Chapter 14, shall be published on Thursday, March 10, 2016 in the South Sioux City Star newspaper and at http://deq.ne.gov/ under "Public Notices." Persons or groups shall have 30 days from that issuance of public notice (ending April 8, 2016) to provide the NDEQ with any written comments concerning the proposed permit action and/or to request a public hearing, in accordance with Title 129 Chapter 14. If a public hearing is granted by the Director, there will be a notice of that meeting published at least 30 days prior to the hearing.

During the 30-day public comment period, persons requiring further information about the proposed permit should contact:

Ana Williams
Construction Permitting Unit
NDEQ Air Quality Division
(402) 471-2189

Prior to the end of the 30-day public comment period, persons wanting to submit written comments or a written request for a public hearing may contact the Air Quality Division at:

ndeq.airquality@nebraska.gov

David Graiver, P.E.
Construction Permitting Unit Supervisor
NDEQ Air Quality Division
P.O. Box 98922
Lincoln, NE 68509-8922

If no public hearing is requested, the permit may be granted at the close of the 30-day comment period. If a public hearing is requested, the Director of the NDEQ may choose to extend the date on which the permit is to be granted until after that public hearing has been held.

Telephone inquiries may be made at:

(402) 471-2186

TDD users should call (800) 833-7352 and ask the relay operator to call the Department at (402) 471-2186.

Attachments:
Fact Sheet Attachment

Fact Sheet Attachment

Potential Emissions Summary: EP01 through EP11, FS01

Permit-Limited Capacities

Digester Biogas Flare Hours Usage	500	hrs/yr
Emergency Generator Engine Hours Usage	500	hrs/yr

Emission Point Summary

Emission Point ID#	Emission Unit ID# and Process Description	Control Device ID# and Description
EP01	EU01: 0.80 MMBtu/hr Natural Gas-Fired Process Boiler #1	-
EP02	EU02: 0.80 MMBtu/hr Natural Gas-Fired Process Boiler #2	-
EP03	EU03: 0.80 MMBtu/hr Natural Gas-Fired Process Boiler #3	-
EP04	EU04: 0.80 MMBtu/hr Natural Gas-Fired Process Boiler #4	-
EP05	EU05: 0.80 MMBtu/hr Natural Gas-Fired Process Boiler #5	-
EP06	EU06: 102.0 MMBtu/hr Digester Biogas Flare with 0.1 MMBtu/hr Natural Gas-Fired Pilot	-
EP07	EU07: Biogas Cleanup Skid System	-
EP06 and/or EP07	EU12: Anaerobic Digester #1	EU06 and/or EU07
	EU13: Anaerobic Digester #2	
EP08	EU08: 155 hp Emergency Generator Engine	-
EP09	EU09: 2.25 MMBtu/hr Natural Gas-Fired Make-up Air Unit #1	-
EP10	EU10: 2.25 MMBtu/hr Natural Gas-Fired Make-up Air Unit #2	-
EP11	EU11: 1.505 MMBtu/hr Natural Gas-Fired Make-up Air Unit #3	-
FS01	FS01: Paved Haul Roads	-

Summary of PTE (ton/year)

Pollutant	EP06	EP07	EP08	EP01 through EP05; EP09 through EP11	FS01	Total PTE
PM	0.43	-	2.73E-05	8.16E-02	1.75	2.27
PM_{10}	0.44	-	3.54E-03	0.33	0.35	1.12
$PM_{2.5}$	0.44	-	3.54E-03	0.33	8.60E-02	0.85
SO_x	1.83	-	2.08E-04	2.58E-02	-	1.86
NO_x	1.06	-	1.45	4.30	-	6.80
CO	19.16	-	0.11	3.61	-	22.88
VOC	0.21	-	4.18E-02	0.24	-	0.49
H_2S	1.98E-02	4.15	-	-	-	4.17
GHGs (mass basis)	2,979	16,463	41.43	5,126	-	24,609
CO_2e basis	2,993	27,817	41.47	5,131	-	35,983
Total HAPs	8.11E-04	-	2.56E-02	8.11E-02	-	0.11

Fact Sheet Attachment

Digester Biogas Flare - Biogas Combustion: EP06

Assumptions

- At Standard Conditions, Weight Concentration, mg/m^3 = ppm x MW_{H2S}/molar volume of gas
- Uncontrolled Emission Rate, lb/hr = Weight Concentration x (g/1000 mg) x (lb/453.6 g) x (m^3/35.313 ft^3) x gas flow (scf/min) x (60 min/hr)

Volume Concentration, H_2S (provided by source)	300	ppm	(Highest monitored value from Big Ox Energy - Denmark facility
Molecular Weight (MW), H_2S	34	g/mole	plus a safety factor)
Molecular Weight (MW), Biogas	24.96	g/mole	
1 Molar volume of gas (at standard condition)	24.06	liters	

Component	Percentage	Molecular Weight	
Methane	68%	16 g/mol	(Highest monitored value from
Carbon Dioxide	32.0%	44 g/mol	Big Ox Energy - Denmark facility)
H_2S	0.0300%	34 g/mol	
SO_2	–	64 g/mol	

Weight Concentration, H_2S	424	mg/m^3	
Biogas Flow Rate - Maximum Design Value	2,500	scf/min	(Maximum design value)
Biogas Flow Rate - Maximum Hourly	0.15	MMscf/hr	
Methane Flow Rate - Maximum Hourly	0.10	MMscf/hr	
Biogas Flow Rate - Annual Maximum	1,314	MMscf/yr	
Methane Flow Rate - Annual Maximum	893.52	MMscf/yr	
Uncontrolled Emission Rate, H_2S	3.97	lb/hr	
Uncontrolled Emission Rate, H_2S	17.39	ton/year	(Assumes full-time flare operation (8760 hrs/yr))
Estimated Flare Control Efficiency Conversion of H_2S to SO_2	98%		
Controlled Emission Rate, H_2S	0.08	lb/hr	
Controlled Emission Rate, H_2S	0.35	ton/year	(Assumes full-time flare operation (8760 hrs/yr))
Heat Content of Methane	1,000	Btu/scf	
Heat Content of Biogas	680	Btu/scf	
Operating Time	500	hours/year	(Limit to flare operation)
Calculated Biogas Heat Input of Flare - Max Hourly [Gas Flow Rate (MMscf/hr) x Heat Content of Biogas (Btu/scf)]	102.00	MMBtu/hr	
Calculated Biogas Heat Input of Flare - Annual Max [Gas Flow Rate (MMscf/yr) x Heat Content of Biogas (Btu/scf)]	893,520	MMBtu/yr	
Calculated Methane Heat Input of Flare - Max Hourly [Methane Flow Rate (MMscf/hr) x Heat Content of Methane (Btu/scf)]	102.00	MMBtu/hr	
Calculated Methane Heat Input of Flare - Annual Max [Methane Flow Rate (MMscf/yr) x Heat Content of Methane (Btu/scf)]	893,520	MMBtu/yr	

Pollutant	Emission Factors[1]		Potential Emission Rate (lbs/hr)	Potential Emission Rate (tons/year)	Limited Operation Potential Emission Rate (tons/yr)
PM	17	lb/MMdscf Methane	1.73	7.59	0.43
PM_{10}	17	lb/MMdscf Methane	1.73	7.59	0.43
$PM_{2.5}$	17	lb/MMdscf Methane	1.73	7.59	0.43
SO_2	7.32	lb/hr[2]	7.32	32.08	1.83
NO_x	40	lb/MMdscf Methane	4.08	17.87	1.02
CO	750	lb/MMdscf Methane	76.50	335.07	19.13
VOC	5.5	lb/MMscf	0.83	3.61	0.21
H_2S	0.08	lb/hr[3]	0.08	0.35	1.98E-02
Greenhouse Gases[4][5]					
CO_2	114.79	lb/MMBtu Biogas	11,709	51,284	2,927
CH_4	7.10E-03	lb/MMBtu Biogas	0.72	3.17	0.18
N_2O	1.40E-03	lb/MMBtu Biogas	0.14	0.63	3.57E-02
GHGs (mass basis)			11,709	51,287	2,927
CO_2e basis			11,768	51,544	2,942

[1]Emission Factors for PM, PM_{10}, and $PM_{2.5}$, NO_x, and CO taken from AP-42 Table 2.4-4 (11/1998) and VOC from AP-42 Table 1.4-2 (7/1998), SO_2 and H_2S established from information/calculation above.

[2]SO_2 Emission Factor (lb/hr) = Uncontrolled Emission Rate, H_2S (lb/hr) x Estimated Control Efficiency (%) x (MW_{SO2}/MW_{H2S})

[3]H_2S Emission Factor (lb/hr) = Uncontrolled Emission Rate, H_2S (lb/hr) x [100% - Estimated Control Efficiency (%)]

[4]Emission Factors for CO_2, CH_4 and N_2O, from 40 CFR 98 Tables C-1 (11/29/2013) and C-2 (11/29/2013)

[5]The Global Warming Potentials (GWP) are from 40 CFR Part 98 Table A-1 to Subpart A as published October 30, 2009.

Fact Sheet Attachment

Digester Biogas Flare - Pilot Natural Gas Combustion: EP06

Total Heat Input Capacity of Pilot	0.1	MMBtu/hr
Heating Value	1,020	Btu/scf
Operating Time	8,760	hr/yr
Total Natural Gas Usage	9.80E-05	MMscf/hr

Pollutant	Emission Factor[1] (lb/MMscf)	Potential Emission Rate (lbs/hr)	Potential Emission Rate (tons/year)
PM	1.9	1.86E-04	8.16E-04
PM_{10}	7.6	7.45E-04	3.26E-03
$PM_{2.5}$	7.6	7.45E-04	3.26E-03
SO_2	0.6	5.88E-05	2.58E-04
NO_x	100	9.80E-03	4.29E-02
CO	84	8.24E-03	3.61E-02
VOC	5.5	5.39E-04	2.36E-03
Greenhouse Gases[2][3]			
CO_2	119,317	11.70	51.24
CH_4	2.25	2.20E-04	9.66E-04
N_2O	0.22	2.20E-05	9.66E-05
GHGs (mass basis)		11.70	51.24
CO_2e basis		11.71	51.29
Hazardous Air Pollutants			
Benzene	2.10E-03	2.06E-07	9.02E-07
Dichlorobenzene	1.20E-03	1.18E-07	5.15E-07
Formaldehyde	7.50E-02	7.35E-06	3.22E-05
Hexane	1.80	1.76E-04	7.73E-04
Lead Compounds	5.00E-04	4.90E-08	2.15E-07
Naphthalene	6.10E-04	5.98E-08	2.62E-07
Polycyclic Organic Matter	8.82E-05	8.65E-09	3.79E-08
Toluene	3.40E-03	3.33E-07	1.46E-06
Arsenic Compounds	2.00E-04	1.96E-08	8.59E-08
Beryllium Compounds	1.20E-05	1.18E-09	5.15E-09
Cadmium Compounds	1.10E-03	1.08E-07	4.72E-07
Chromium Compounds	1.40E-03	1.37E-07	6.01E-07
Cobalt Compounds	8.40E-05	8.24E-09	3.61E-08
Manganese Compounds	3.80E-04	3.73E-08	1.63E-07
Mercury Compounds	2.60E-04	2.55E-08	1.12E-07
Nickel Compounds	2.10E-03	2.06E-07	9.02E-07
Selenium Compounds	2.40E-05	2.35E-09	1.03E-08
Total HAPs		1.85E-04	8.11E-04

[1]Emission Factors from AP-42 Tables 1.4-1. 1.4-2, 1.4-3 and 1.4-4 (7/1998)

[2]Emission Factors for CO_2, CH_4 and N_2O, from 40 CFR 98 Tables C-1 (11/29/2013) and C-2 (11/29/2013). Converted to lb/MMscf.

[3]The Global Warming Potentials (GWP) are from 40 CFR Part 98 Table A-1 to Subpart A as published October 30, 2009.

Fact Sheet Attachment

Digester Biogas Flare - Total Emissions: EP06

Pollutant	Potential Emission Rate: Biogas Combustion (lb/hr)	Potential Emission Rate: Pilot Natural Gas Combustion (lb/hr)	Total Potential Emission Rate (lb/hr)	Total Potential Emission Rate (tons/year)	Limited Operation Potential Emission Rate (tons/yr)
PM	1.73	1.86E-04	1.73	7.60	0.43
PM_{10}	1.73	7.45E-04	1.73	7.60	0.44
$PM_{2.5}$	1.73	7.45E-04	1.73	7.60	0.44
SO_2	7.32	5.88E-05	7.32	32.08	1.83
NO_x	4.08	9.80E-03	4.09	17.91	1.06
CO	76.50	8.24E-03	76.51	335.11	19.16
VOC	0.83	5.39E-04	0.83	3.62	0.21
H_2S	0.08	-	0.08	0.35	1.98E-02
Greenhouse Gases					
CO_2	11,709	11.70	11,720	51,335	2,978
CH_4	0.72	2.20E-04	0.72	3.17	0.18
N_2O	0.14	2.20E-05	0.14	0.63	3.58E-02
GHGs (mass basis)	11,709	11.70	11,721	51,339	2,979
CO_2e basis	11,768	11.71	11,780	51,595	2,993
Total HAPs	-	1.85E-04	1.85E-04	8.11E-04	8.11E-04

Fact Sheet Attachment

Biogas Cleanup Skid System: EP07

Assumptions

- At Standard Conditions, Weight Concentration, mg/m^3 = ppm x MW_{H2S}/molar volume of gas
- Uncontrolled Emission Rate, lb/hr = Weight Concentration x (g/1000 mg) x (lb/453.6 g) x (m^3/35.313 ft^3) x gas flow (scf/min) x (60 min/hr)

Volume Concentration, H_2S (provided by source)	300	ppm	
Molecular Weight (MW), H_2S	34	g/mole	
Molecular Weight (MW), Tail Gas	40.52	g/mole	(Molecular weight based on gas concentration below)
1 Molar volume of gas (at standard condition)	24.06	liters	

Component	Percentage	Molecular Weight
Methane	8.73%	16 g/mol (Percentage from vendor cut sheets for gas cleanup skid)
Carbon Dioxide	88.9%	44 g/mol
H_2S	0.0300%	34 g/mol
SO_2	–	64 g/mol

Weight Concentration, H_2S	424	mg/m^3
Weight Concentration, Methane	58,055	mg/m^3
Weight Concentration, Carbon Dioxide	1,625,586	mg/m^3
Gas Flow Rate - Maximum Hourly	596	scf/min
Gas Flow Rate - Maximum Hourly	3.58E-02	MMscf/hr
Methane Flow Rate - Maximum Hourly	3.12E-03	MMscf/hr
Gas Flow Rate - Annual Maximum	313.26	MMscf/yr
Methane Flow Rate - Annual Maximum	27.35	MMscf/yr
Uncontrolled Emission Rate, H_2S	0.95	lb/hr
Uncontrolled Emission Rate, H_2S Based on 8,760 operating hours	4.15	ton/year
Uncontrolled Emission Rate, Methane	129.61	lb/hr
Uncontrolled Emission Rate, Methane Based on 8,760 operating hours	567.68	ton/year
Uncontrolled Emission Rate, Carbon Dioxide	3,629	lb/hr
Uncontrolled Emission Rate, Carbon Dioxide Based on 8,760 operating hours	15,895	ton/year
Estimated Flare Control Efficiency Conversion of H_2S to SO_2	0%	
Operating Time	8,760	hours/year

Pollutant	Emission Factors (lbs/hr)	Potential Emission Rate (lbs/hr)	Potential Emission Rate (tons/year)
H_2S	0.95	0.95	4.15
Greenhouse Gases[2],[3]			
CO_2	3,629	3,629	15,895
CH_4	129.61	129.61	567.68
GHGs (mass basis)		3,759	16,463
CO_2e basis		6,351	27,817

[1] H_2S Emission Factor (lb/hr) = Uncontrolled Emission Rate, H_2S (lb/hr) x Estimated Control Efficiency (%).

[2] Emission Factors for CO_2 and CH_4, from Uncontrolled Emission Rate (lb/hr) x Estimated Control Efficiency (%).

[3] The Global Warming Potentials (GWP) are from 40 CFR Part 98 Table A-1 to Subpart A as published October 30, 2009.

Fact Sheet Attachment

Natural Gas-Fired Engine: EP08

Engine Output (hp)	155
Engine Heat Input (MMBtu/hr)[1]	1.42
Maximum Hours of Operation (hrs/yr)	500

Pollutant	Emission Factor[2] (lb/MMBtu)	Emission Rate (lbs/hr)	Emission Rate (ton/year)
PM	7.71E-05	1.09E-04	2.73E-05
PM_{10}	9.99E-03	1.41E-02	3.54E-03
$PM_{2.5}$	9.99E-03	1.41E-02	3.54E-03
SO_x	5.88E-04	8.33E-04	2.08E-04
NO_x	4.08	5.78	1.45
CO	0.32	0.45	0.11
VOC	0.12	0.17	4.18E-02
Greenhouse Gases			
CO_2[3]	116.98	165.73	41.43
CH_4[4]	2.20E-03	3.12E-03	7.81E-04
N_2O[4]	2.20E-04	3.12E-04	7.81E-05
GHGs (mass basis)		165.73	41.43
CO_2e basis[5]		165.89	41.47
Hazardous Air Pollutants			
Acetaldehyde	8.36E-03	1.18E-02	2.96E-03
Acrolein	5.14E-03	7.28E-03	1.82E-03
Benzene	4.40E-04	6.23E-04	1.56E-04
Formaldehyde	5.28E-02	7.48E-02	1.87E-02
Methanol	2.50E-03	3.54E-03	8.85E-04
n-Hexane	1.11E-03	1.57E-03	3.93E-04
Toluene	4.08E-04	5.78E-04	1.45E-04
Other HAPs	1.51E-03	2.14E-03	5.36E-04
Total HAPs	7.23E-02	0.10	2.56E-02

[1] Calculated using a maximum fuel consumption of 1,389 cfh supplied in the application.

[2] Emission factors from AP-42, Chapter 3.2 (8/2000), Table 3.2-2.

[3] Emission factor from 40 CFR 98 Table C-1 (11/29/2013). Converted to lb/MMBtu.

[4] Emission factor from 40 CFR 98 Table C-2 (11/29/2013). Converted to lb/MMBtu.

[5] 40 CFR 98 Table A-1 as published October 30, 2009.

Fact Sheet Attachment

Natural Gas-Fired Boilers and Make-up Air Units: EP01 through EP05; EP09 through EP11

Heat Input Capacity Combined Units (MMBtu/hr)	10.01
Heating Value of Natural Gas (Btu/scf)[1]	1,020
Natural Gas Throughput (MMscf/hr)	9.81E-03
Maximum Hours of Operation (hrs/yr)	8,760

Pollutant	Emission Factor[2] (lb/MMscf)	Emission Rate (lbs/hr)	Emission Rate (ton/year)
PM	1.90	1.86E-02	8.16E-02
PM_{10}	7.60	7.45E-02	0.33
$PM_{2.5}$	7.60	7.45E-02	0.33
SO_x	0.60	5.89E-03	2.58E-02
NO_x	100.00	0.98	4.30
CO	84.00	0.82	3.61
VOC	5.50	5.39E-02	0.24
Greenhouse Gases			
CO_2[3]	119,317	1,170	5,126
CH_4[4]	2.25	2.21E-02	9.66E-02
N_2O[4]	0.22	2.21E-03	9.66E-03
GHGs (mass basis)		1,170	5,126
CO_2e basis[5]		1,172	5,131
Hazardous Air Pollutants			
Formaldehyde	7.50E-02	7.36E-04	3.22E-03
Hexane	1.80	1.77E-02	7.73E-02
Other HAPs	1.35E-02	1.32E-04	5.78E-04
Total HAPs		1.85E-02	8.11E-02

[1] AP-42 Section 1.4.1 (7/1998).

[2] Emission factors from AP-42, Chapter 1.4 (7/1998), Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4.

[3] Emission factor from 40 CFR 98 Table C-1 (11/29/2013). Converted to lb/MMscf.

[4] Emission factor from 40 CFR 98 Table C-2 (11/29/2013). Converted to lb/MMscf.

[5] 40 CFR 98 Table A-1 as published October 30, 2009.

Fact Sheet Attachment

Paved Haul Roads: FS01

Paved roads {AP-42 Chapter 13.2.1 (1/11)}

Equation (2): (modified)

$$E = k \times (sL)^{0.91} \times (W)^{1.02} \times \left(1 - \frac{P}{4 \times 365}\right)$$

	k
PM	0.011
PM_{10}	0.0022
$PM_{2.5}$	0.00054

Unpaved roads {AP-42 Chapter 13.2.2 (11/06)}

Equation (1a): (modified)

$$E = k \times \left(\frac{sC}{12}\right)^{a} \times \left(\frac{W}{3}\right)^{b} \times \left(\frac{365 - P}{365}\right) \times \left(\frac{S}{30}\right)^{d} \times (1 - CE)$$

	k	a	b	d
PM	4.9	0.7	0.45	0.3
PM_{10}	1.5	0.9	0.45	0.5
$PM_{2.5}$	0.15	0.9	0.45	0.5

Haul Road / Traffic Parameters

Activity / Road Description	Road Type / Silt Value		Roundtrip Length (feet)		Truck Weight (tons)			Ave. Speed (mph)	Unrestricted Maximum Throughput (units/yr)	Ave. Truck Capacity (units/truck)		Annual VMT
			empty	full	empty	full	Ave.					
High Strength Waste	p	3.00	943	943	12.5	40	26.3	30	60,225	28	ton	782
Dewatered Cake	p	3.00	1,604	1,604	12.5	40	26.3	30	60,225	28	ton	1,331
Packaged Waste	p	3.00	943	943	12.5	40	26.3	30	60,225	28	ton	782
Waste Packaging	p	3.00	943	943	12.5	40	26.3	30	60,225	28	ton	782
Sulfur Solids from Biogas Cleanup	p	3.00	943	943	12.5	40	26.3	30	60,225	28	ton	782

Emission Calculations

Activity / Road Description	Emission Factors (lb/VMT)			Potential Emissions (tons/yr)		
	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
High Strength Waste	0.79	0.16	0.04	0.31	0.06	0.02
Dewatered Cake	0.79	0.16	0.04	0.52	0.10	0.03
Packaged Waste	0.79	0.16	0.04	0.31	0.06	0.02
Waste Packaging	0.79	0.16	0.04	0.31	0.06	0.02
Sulfur Solids from Biogas Cleanup	0.79	0.16	0.04	0.31	0.06	0.02
Total Annual Emissions:				1.75	0.35	0.09

Description of Constants/Variables

E: haul road emissions (lb/VMT)

k, d: dimensionless constants from AP-42 Chapter 13.2.1 (1/11) (paved)

k, a, b, c, d: dimensionless constants from AP-42 Tables 13.2.1-1 (1/11) & 13.2.2-2 (11/06) (unpaved)

sL: silt loading (g/m^2) of paved road surface

sC: silt content (%) of unpaved road surface

W: average vehicle weight (tons)

P: days/yr with at least 0.01" of precipitation

P = 90 default = 90

S: mean vehicle speed on road (mph) default = 30, minimum =15

CE: unpaved road, dust control efficiency

CE = 0 % default = 0%

VMT: vehicle miles traveled

Fact Sheet Attachment

Chapter 20 PM Emissions Limitations: EP01 through EP06; EP08 through EP11

Title 129, Chapter 20, Section 002, Table 20-1

Total Heat Input (MMBtu/hr)	Maximum Allowable Emissions of PM (lbs/MMBtu)
10 or less	0.6
Between 10 and 10,000	$1.026/I^{0.233}$
	Where I = total heat input in MMBtu/hr.
10,000 or more	0.12

Emission Point	Maximum MMBtu/hr	Allowable PM (lbs/MMBtu)	Unit PM emission rate (lbs/MMBtu)
EP01	0.80	0.60	1.86E-03
EP02	0.80	0.60	1.86E-03
EP03	0.80	0.60	1.86E-03
EP04	0.80	0.60	1.86E-03
EP05	0.80	0.60	1.86E-03
EP06	102.00	0.35	1.70E-02
EP08	1.42	0.60	7.71E-05
EP09	2.25	0.60	1.86E-03
EP10	2.25	0.60	1.86E-03
EP11	1.51	0.60	1.86E-03